VoiceExpeditions

VOICE EXPEDITION INTERVIEW TRANSCRIPT
The Oral History of Nephrology
Jack Cole
Interviewed by Dugan W. Maddux, MD
September 15, 2009

DWM: So it is Tuesday, September the 15th, 2009 and I'm in Seattle at the Scribner Kidney Center today to talk to Jack Cole and I just wanted to thank you for letting me come to Seattle today to meet with 'ya.

JC: My pleasure.

DWM: And I want to start with just tell me where you were born and raised and how the, maybe that will lead us to how you got into the dialysis.

JC: When I was, I was born and raised in Eastern Washington in the Spokane area. I lived in a little town called Green Acres, Washington. I remember when I went to college, the people would always say well, where are you from and I'd say, well I'm from Spokane, well, I went to the University of Idaho. And uh, the, a lot of the students at the U of I were from Boise which was a bigger town than, than Spokane. Well no I'd, actually what I would say is I'm, I'm from Green Acres and you know, obviously, Boise is a much bigger town than Green Acres in Washington which nobody had ever heard of.

DWM: Heard of.

JC: So then I decided, well, I'll, I'll just tell them that I'm from Spokane which is also the truth because it's just a suburb of Spokane. Then all of the sudden I was the big dog because I'd come from a bigger, a bigger city than these kids and at the University of Idaho. Anyway I went, I went to the University of Idaho in the pre-med program.

DWM: Pre-med?

JC: Pre-med program and came over here to the U as a first year student in, in the medical school.

DWM: Everybody calls it the U, but you mean the University of Washington?

JC: The University of Washington, right. And it wasn't a good fit for me. I, I, I liked some of the science, but the, the prospect of being responsible for people's health and all of the implications of that just, it wasn't a good, a good match for me. So I, I stayed for a year and then switched to the graduate program in, in Psychology. I wanted to go into clinical Psych and my wife and I had been married since our Sophomore years at The University of Idaho, so she was over here working and I stayed in the Psych program for a year and then we ran out of money and we had a, we had a baby that was on the way so, all of a sudden I was on the street looking for work. And I had, I had the option of, after looking for two or three weeks; two possibilities came up all at the, at the same time. One was to work at the, at a brewery in Seattle, in the laboratory. Or the other one was a possibility of working in the Department of

Medicine at The University of Washington and I almost flipped a coin. And as it turned out when I, when I took the job I, I, I joined Scribner's group in February 15 of 1960 and of course in, in any new job there's a period of adaptation where you're trying to figure out what's going on and all. But it enabled me to see the program right from the outset. The, the first dialysis on the 9th of March, just a few weeks after I joined the program. And actually, before Clyde Shields was, was cannulated the first time we, we cannulated another patient. The, the very first patient was an acute. I don't remember the name or even the circumstances around it. But, that, that patient received the first pair of Teflon Cannulas that were put in anybody and then Clyde Shields was the second patient just a, a few days later. But my principal job, the reason I was hired was to work on the, on Scrib's dialysis program, which at that time was strictly for acute patients. He had begun to develop the program when he was at The Seattle V.A. Hospital before he transferred to The University and at that time we were the only facility in the Pacific Northwest doing any acute dialysis at all. So we were covering Idaho, Montana, Oregon, Alaska and we even had patients coming down from B.C., British Columbia.

DWM: Um hm.

JC: And then in the middle of all this he started his program with, with Clyde Shields and it got very hectic because we had very limited resources. Both in terms of people and, and the dialyzers. And so we were jumping all around, spending lots, lots of time and lots of hours and uh, trying to hold it all together.

DWM: Let's talk about the acute program. So when you were hired by Scribner, what he was talking to you was about his acute program. What exactly did he want you to do to help with that acute program? How many acute dialysis treatments were they doing? Where in the hospital were they doing them and what would, would your role have been?

JC: My role principally was to take care of the equipment. At that time we were, we were using the Skeggs-Leonard Dialyzer, building is as a a 12th, a twelve layer unit which entailed not only building it but, testing it. Sterilizing it and all of, all of those kinds of things. And then for the dialysis supply itself, we were using either a 300 liter or a 450 liter Sears Roebuck freezer on, on wheels that we'd push around various places in the hospital and we didn't really have an assigned room at that time. We, we, we went to several rooms on, I believe it was the, it seems to me it was the 4th floor at University Hospital.

DWM: Let's go back to the Skeggs-Leonard Dialyzer. And can you, when you say it's a twelve layer unit. Tell me what it meant to put together a Skeggs-Leonard Dialyzer and test it and sterilize it. What exactly did you have to do?

JC: Well, the, at that time the unit consisted of each, each layer was, was two rubber plates and then between the rubber, between each pair of rubber plates was a, a stainless steel plate to stiffen the, the assembly and we'd, we'd assemble them, the, it's, it's a little complicated to explain. But the, the way the blood was manifolded in the Skeggs-Leonard Dialyzer, each membrane had a, had two holes at, at opposite ends of the Dialyzer. One hole was part of the manifolding system for the blood delivery and

the other hole was for the, the dialysate to come in. So you had envelopes of, of cellophane. Each, each envelope surrounded by a rubber mat on the top and the bottom and then a steel plate and then another layer. And we'd, we'd build those and, and after they were assembled, the whole, the whole dialyzer was clamped down with a, a very rigid outer plate and on, on the top and one on the bottom. And then the testing considered, consisted of pumping the blood compartment with pressurized air and just seeing whether, whether any air leaked out or not. If it, if it didn't, why the Dialyzer was ready to be sterilized. If it did leak out then we'd have to tear it apart and start all over again. Each Skeggs-Leonard Dialyzer had, oh it must have been eighty-five or ninety individual parts that had to be prepared. And the, the manifolding not only was the holes and the cellophane, but inside each cellophane envelope were two metal plates that, that held the cellophane apart slightly so that the, the blood could make its entry. Each one of those metal plates, after a dialysis; had to be acid cleaned to get the blood off, then silicone coated so that, for the next dialysis; when blood came it, it wouldn't clot against the metal. So each, each preparation cycle was, was usually several hours longs because it would, it was pretty unusual to build one and have it work the first time.

DWM: So you, it, it was pretty common to build it and have a pressure leak? And have to come back and reassemble.

JC: That's right. And have to, have to go back and do it again. And I, I got there. In one way I got there at just the right time because until just weeks before I started with the Scribner program, the membranes were boiled because there was this idea that. Well, people were having Powergenic Reactions and it was called Membrane Fever, but it wasn't really clear what the, what the origin of it was. By the time I got there, Scribner had changed to Zephiran Chloride Sterilization; a chemical agent that we'd put in there and, and. The Zephiran would be in there for well, a minimum of about an hour to make sure that everything was sterilized and then for, for dialysis we had to purge all the, all the Zephiran out with sterile saline and, and then take it up on the ward.

DWM: Zephiran?

JC: Z e p h i r a n.

DWM: Okay.

JC: Zephiran Chloride.

DWM: Zephiran. Okay.

JC: It's still around.

DWM: So you were lucky because you came and they had solved the Membrane Fever problem by that time?

JC: That's right.

DWM: And it had to do with the sterilant or the sterilization procedure?

JC: Well nobody seemed to know what was, what was causing. Uh, I, I think it probably had it origins in, in pyrogen reactions from some other chemical sterilant that was used and then to avoid that, they would boil the membranes because they weren't sure whether it was because of the sterilant or because something was, was coming off the membranes that was causing it.

DWM: Right. The cellophane you were using. Did it come in bulk? How did you get the cellophane and how did you get it the right size to. Would the membranes come already pre-manufactured to fit in the Skeggs-Leonard Dialyzer or did you have to,

JC: No we had to, we had to cut them. We used a, a cork cutter to cut the holes in the ends of the, of, of the membranes. We, we would have a, a block of membranes; perhaps a half an inch deep and we'd put it in a little, in a little holding container so that everything would be held rather, rather tightly and then we'd just take a cork borer that was pretty sharp and we'd, we'd bore the holes in it. And, and go ahead and, and use it after that.

DWM: How long did it take you to learn to do all of that?

JC: It didn't, it doesn't seem like it took very long at all. It was all, all pretty basic stuff. It was just that there was so much of it.

DWM: Yeah.

JC: To do.

DWM: Pretty complex. And who were you working with, do you remember?

JC: Well at that time the, the lab was, the, the lab where the Dialyzer was assembled was a, a little room off the Analytical Lab that Doctor Scribner had and, and. When I first got there I was supervised by the, the woman who was also the Supervisor for, for, for the Analytical Work. A woman named Pat Hoover and then after a short period of time, why, I guess after I'd proven myself; well, I, I had responsibility for it.

DWM: Okay.

JC: And that at a, at a later time as we expanded, why we moved out of those quarters because they were so cramped and we were assigned a room down on the, in the basement of the, of the hospital.

DWM: Still talking about the acute, you know, building the Skeggs-Leonard Dialyzer for the acute patients, once the dialyzer was built and the procedure was going to start, who, what accesses were being used? Who put in the access and what would be your role during the dialysis treatment itself?

JC: Well, the accesses at the very beginning were, were Polyethylene Catheters that were surgically placed by one of the, one of the surgical staff. And then after, after the initial success with the Teflon Catheters or Cannulas, why uh, that became standard procedure for vascular access.

DWM: Right. So in the acutes, when you first came maybe they'd still be using the surgically placed catheter, the, and the polyethylene catheter.

JC: Um hm.

DWM: And what would be your role during the treatment in an acute treatment?

JC: As strictly related to the equipment. Getting it, getting it up on the ward and then getting back after the treatment was over. They'd call on us. The, the treatment itself required pressure monitoring of the, of the, of the circuitry in it and we were using a blood pump at that time. At the, at the very beginning.

DWM: Okay.

JC: So, it, it seems surprising to say so, but we used U-Tube Mercury Manometers for pressure measurement. And one of the roles that I had, or the people that were working for me had, was to set all this up. Get the, get the Heparin pump at the, at the bedside. Make sure that this dialysate bath had been properly prepared in our laboratory. And, and tested. Tested with the Scribner bedside kit. And then we would wheel this assembly with, with a, a, a cover, a rigid cover on the top of the, of the deep freeze tag with the Dialyzer on top of that and a U Tube Manometer and a, a, a little pump that had been originally designed for backyard displays so to speak. You know, some people had these little, uh, oh what am I trying to say? It's a, it's a pedestal with a, a bowl in it? And then the water sprays up?

DWM: Like a fountain?

JC: Ah, just a fountain. That's the word I'm stumbling on. This, this little pump was a, was designed for that purpose and we, and we used it, we'd simply drop it into the bottom of the, of the Dialysate tank and then run a rubber hose up to the, to the Dialyzer and then another hose from the Dialyzer back into the tank again. So that's it was a continuous,

DWM: Circulating,

JC: Cycle. And when I, when I first arrived we were running that at, at the Dialysate temperature of 40 degrees C. Later on we were able to demonstrate that, that we could do it successfully at 20 degrees Centigrade. But the whole idea was that the, the low temperature inhibited bacterial growth. Because there was always bacterial growth there, you know, up under those kind of primitive circumstances. And uh,

DWM: So you're, you're putting together a dialysis treatment that involves a freezer, like a, did you say it was a Sears?

JC: Sears Roebuck.

DWM: Roebuck freezer?

JC: Yeah.

DWM: And a backyard fountain pump. (LOL) Which is pretty,

JC: A submersive, a submersible pump. Yeah.

DWM: Yeah. And so I gather that Scribner and his group had just gradually put together this group of equipment, this equipment that would work? I mean it's sort of piecing together,

JC: Oh, absolutely piecing it together. Yeah.

DWM: Yeah.

JC: Yeah. And I, I don't know the rationale or all, all the things that happened before I got there. It was just, it was there. (LOL) And,

DWM: Somebody had figured it out.

JC: Somebody had figured it out. Well it was Scribner that figured it out I'm sure because he was, he was and inventor, tinkerer and had all kinds of, of ideas. Good and bad that we, we tested at one time or another. But that was the way the system was at, at, at the, at the very beginning.

DWM: And the Dialysate, you were mixing up bulk Dialysate. When you all, you, were you, were you considered a technician?

JC: Um hm.

DWM: Is that a dialysis technician?

JC: Yeah.

DWM: And what would, did it, what did you have to do to get the dialysate itself ready?

JC: Well, we'd, we'd start, we had, we, we, we would pre-weigh bags of dry chemicals. Sodium Choloride, Glucose all of them. And we had, we had two different formulations. One for the 300 liter tank and, and one for, I mean, the formulation was the same, but the volumes or the quantities were

different for obvious reasons. And we had all this plastic bags of these chemicals up on a, on a series of shelves all carefully labeled so that you know, there, nobody would make a mistake and we would put one bag of each chemical into the, into the tank and then start filling it with water and to, to agitate it since these tanks were ah, four, four to five feet long, we used a canoe paddle which Scribner had donated. It kept, the paddle's out here. If you, you've probably seen it.

DWM: I've seen it. I'm going to take a picture of that.

JC: And uh, so, we'd use that canoe paddle until it looked like the, all the electrolytes had gone into solution. And then using the Scribner Bedside Kit which measured, measured Bicarbonate and total Sodium and Chloride, and Potassium, we would assure ourselves that everything was ready to go. And if it wasn't, why we'd pump it out and start again. Not knowing what, what the problem was, but,

DWM: Right.

JC: We never had an error. I mean, we had errors in the laboratory, but we never had an error on the ward.

DWM: Yeah.

JC: And uh,

DWM: Amazing.

JC: Yeah, it is amazing.

DWM: Yeah.

JC: Thinking about it.

DWM: So when you came and you were setting up all this for acute dialysis, about how many acute dialysis treatments were they doing at, a, a, a week?

JC: Oh, it, it varied a lot. The, it, it, during the hunting season things really got intense because people out deer hunting and elk hunting were shooting each other by accident. And we had, well we had some really sad cases that came in because, because of that. We had, we also I remember on one occasion we had a Russian Seaman who had fallen on a Russian Cargo Ship off the coast of Washington and the Coast Guard picked him up and brought him in because he had, had a shut down and, and uh, and we had people that had the usual postsurgical shut down. But they'd come in from, from all over. To answer your question about numbers, we probably did oh one every two or three weeks on average. It seemed like they would come in, in groups.

DWM: You'd have a whole bunch at once and then,

JC: We'd have a bunch at once or within two or three days and of course it wasn't just a matter of one dialysis. We'd end up doing several treatments on them.

DWM: Yeah. Um, typically how long would the treatments last and how frequently would you be doing them, do you remember?

JC: Uh, they'd last up to twenty-four hours although on a few occasions where we had patients that were really catabolic, the treatments would last two and half, three days.

DWM: Um.

JC: And we would have to replace the, the, the dialysate, the, the bath as we called it after about uh, I think it was about every twelve hours because the urine build up, you know, would, would bring it to the point where nothing was happening.

DWM: You had no concentration gradient.

JC: That's right.

DWM: And when you had to change the dialysate, did you just temporarily disrupt, interrupt the dialysis treatment? Just stop for a period of time?

JC: Usually not. Usually what we would do would be to get a couple of brawny people to come and lift up the dialyzer and we'd put the heparin pump off on a bedside stand and then we'd move the tank with the spent dialysate out and, and move another tank into the same location and put the dialyzer back on top of the new tank and, and keep going.

DWM: So just swap it out real quickly, yeah.

JC: Yeah. There were, there were occasions where we, where we would clamp the blood lines. We wouldn't stop the dialysis eh, except for just a minute or two if uh, you know, in the cramped quarters of the, the treatment room why sometimes things didn't really work out the way you'd like them to. And we'd have to make adjustments. But one of the problems that we had was a limitation on the, we had, we had two blood pumps and fortunately we got to the point where we were able to eliminate the blood pump in most cases unless the patient was hypertensive because we could use this pumpless low temperature system that had, had evolved and, and the patient's blood pressure would cause, cause enough blood flow to, to do adequate treatment. And,

DWM: Because you were limited. If you had more than two patients at a time, eh, you had two blood pumps,

JC: Yeah.

DWM: And that was it. Yeah.
JC: That's right. And, and one of the, one of the two was not a very, not a very good one. The other one is out in the, in the,

DWM: The good one is out here? (LOL) Okay.

JC: The good one is out here.

DWM: I definitely want to see that. Good. What was your impression of how the acute patients did on, with this dialysis treatment? I mean, did you generally feel like this was a good, providing good, good outcomes?

JC: Yeah, I think so. I think so. Looking back on it, we were, we were doing sled dialysis back before it was called that, you know? We were, we had these people on for hours and hours and hours at low flows. And that's exactly what they do now days.

DWM: Yeah.

JC: And we didn't, we weren't able to save all of them by any means, but I think it was a very successful program, especially given the kind of archaic conditions that we were operating under at, at that time.

DWM: Archaic meaning just the equipment itself was,

JC: Yeah, there are just a lot of limitations and

DWM: Yeah.

JC: People didn't know then all the, all that they know now about how to do proper dialysis. It was kind of hit and miss and that especially showed up when we started doing chronic dialysis.

DWM: Well, let's talk about chronic dialysis. So, were you there when Clyde Shields first started and,

JC: I was.

DWM: So tell me about that first treatment and,

JC: Well, it, it, for, for me it was still a little bit, I, I didn't understand the significance of it. It was just like doing another, another dialysis like we had been doing for, for, for many weeks. And it was just another, another patient. But after, after doing that and seeing Scrib's excitement over what had happened and and seeing the, the spree develop with, with the group that was, was involved. We all took up the challenge. It was, it's interesting to me looking back on that. Clyde was, Clyde was treated on March 9th as I mentioned and I don't remember how long he was treated, but I, I'm, I'm quite sure

that he was only treated once a week in those, in those early days. And probably not for anything near twenty-four hours. But with some monitoring of, of the BUN and so on. But by the, by the middle of April Scribner had seen enough to be convinced that, the he was on to something really significant and he, he took Clyde and his wife Amy Shields back to Chicago for the annual meeting of the American Society of Artificial Internal Organs. Just think about that. One patient and I think actually we had a second patient that had just come on board Harvey, Harvey Gentry. But to have that amount of confidence or, or optimism to, to put his reputation on the line and go back and give a presentation. He wasn't even on the program for that. And, and to talk George Schreiner, who was the editor of the ASAIO Journal into accepting a late paper on that topic. What a, what a gutty thing to do.

DWM: Right. How, how do you think he knew, what do you think he knew had been accomplished in that month?

JC: Well, I, I think it goes to his character. He, he was the eternal optimist in most cases. I remember on a totally different time many, many years later; this illustrates what I'm saying, he, he had worked fairly closely with Henry Jackson who was our State Senator in part because a high school classmate of Henry Jackson's was one of our patients. So he, he and Jackson talked back and forth and there was a time when Jackson called him up and said I'd like to bring some folks to the University to see your program. Uh, could that be arranged? And Scrib thought, now that Jackson has, has taken a real interest in this, this program is going to move. Not just here, but, but national because yeah, Jackson had that kind of stature. So Jackson arrived with a photographer and an entourage and we went around and talked to the patients and, and put on a real program for him and then he went back and continued to run for reelection and the whole thing was, was simply a publicity event for Jackson himself to be reelected. And then and Scrib hadn't realized that. And then he was really crest-fallen because nothing, nothing happened after, after Jackson had been there. (LOL)

DWM: He had high hopes, yeah.

JC: High hopes, yeah.

DWM: Yeah. So Clyde Shields and you said, you maybe didn't fully appreciate the excitement at the time, but the big excitement was they had this shunt that they put in for him.

JC: That's right.

DWM: That was going to allow them to repeatedly dialyze him over a long period of time.

JC: Um hm.

DWM: What do you remember about the shunt and what it took to get to that point where they actually started using it for this one patient and then Clyde Shields. What, what had been the thought process and who had really helped get to that point where they were ready to insert that?

JC: Well, Scribner said that he had met a, a colleague of his in the hallway one day when, when he was trying to formulate uh, this, this shunt technique and Lauren Winterscheid was the Doctor's name and he said,

DWM: Winterscheid? How do you,

JC: Lauren Winterscheid, it,

DWM: W i n t e r

JC: S c h e i d.

DWM: Okay.

JC: A surgeon. And Winterscheid suggested Scrib explore the idea of using Teflon as a, as a material. Historically other materials had been, had been tried. Glass for example, glass cannulas had, had been used with really limited success. And I think when Scrib described the, the idea of having continuous contact with, with some sort of a foreign material, Winterscheid thought that Teflon, which was then starting to be used in the heart- lung machine in some capacity.

DWM: Um.

JC: Might, might be the answer. And I think Scrib went to Wayne Quinton who at that time was, who was running the University's Medical Instrument Facility and, and he had had some dealings with, with Wayne before in the development of the, of the apparatus. The uh actual manufacture of Skeggs-Leonard Dialyzers and the, the deep freeze. Talked to Wayne and I remember going into the University Central Supply area with Scribner and, and Wayne and there may have been somebody else, but anyway there were at least the three of us and having a discussion about what size tubing to use to, to try to, to fashion cannulas out of it. And there was nothing really very scientific about the discussion at all. It was one of these, well that looks like about the right (LOL) the right size. And, and so, I don't know whether a single size was, was selected or not, but Wayne, Wayne took the idea and and some tubing and he fashioned, I give him enormous credit for this. He, he developed what we came to call a, a mandrel which was a little post-like device that had two, two grooves milled in its circumference. You can see one out here in the picture. And he spent enough time using Teflon; heated Teflon in this mandrel to, to be able to fashion the first of these cannulas. And he's, he's the one that worked at the bedside on the installation of the cannulas in, in Clyde Shields and I think he must have done the first one in the acute person I imagine. And then after that it was turned over to me to, to learn the technique and to teach it to lots of other folks. And at the, at the very beginning, excuse me, the, the, the technique involved placing the, the mandrel in a vice, the vice was in turn attached to a little cart. Just you know, a garden variety laboratory cart. In, in heating the Mandrel with a, either a Bunsen burner or a, a, a propane torch and then you would take the, the Teflon which was almost straight and begin to work it in, in the groove in the mandrel until you'd see the Teflon begin to change color from a pale blue to a translucent appearance. That indicated that it was becoming plastic. And then you'd very carefully begin to, to pull

the outer arms of this thing together so that, the Teflon wouldn't collapse where, where it had lost its strength because it had become so plastic. And it, it took a lot of skill to do that. And, and a lot of failures too to learn how to do it properly. Then after the, after the bend had been made, you would hold it in, in your hands with, with the Teflon in the, in the, in the groove and somebody else would pour sterile saline or water on the, on the top of the mandrel, on the, on the top of this device to, to quench it and then you'd, you'd, you'd take it out and you'd have, if everything worked, worked okay you'd have the first bend of several bends. And in the mean time, the, this, this mandrel that had been quenched and all the, the, the vapor had come off and the windows would be all steamed up, (LOL) Yeah, it looks, it sounds so utterly crude by today's standards and it is, but, it worked.

DWM: Because it wasn't, I mean each one was individually made and would have been made by eye and skill and eye it sounds like. I mean, the mandrel I guess offered you a certain bend, but I mean you were, you were fashioning these just individually by hand.

JC: Well, yeah, we were and we were fashioning them to, to the shape recommended by the surgeon who already had the patient's arm opened up.

DWM: So you were doing them individually, custom-made,

JC: At the bedside, at the bedside. And, and not only that, but this surgeon would say, well the, the end of, of, of this tubing, the, the outer diameter of this tubing is about and eighth of an inch and he would say we need, we need a taper on that because the, the patient's artery is such and such, so, taper it about half. Or taper it about 20% and so there was another heating step and that's was easy, the easy step because you could simply put the, the tubing in front of the, the burner and then as it turned translucent you'd, you'd simply pull it out like this. Pull it,

DWM: Stretch it.

JC: From opposite ends and you'd stretch that, that narrow area that would be going into the patient's blood vessel.

DWM: So custom making the cannula for every patient as they had the cut down ready to go.

JC: Yeah, yeah.

DWM: That's amazing.

JC: And it, at the outset we didn't even think about the fact that the, the, the stretched end or the stretched segment had to be, had to be cut because it was somewhere not at the end of the, end of the cannula. It, it left a, a perfectly sharp edge and later on we realized that some of the problems we were having with the cannulas was because that sharp edge was, was moving in and out of the, or up, up against the vessel intima and so then we added another step which was simply polishing or try to polish with heat the, the, the terminous of the, of the cannula. And that required a fair amount of skill because

if you didn't do it just exactly right, it didn't just burnish that, that, that tip a tiny bit why it would, it would droop because it got too hot and then you'd have to start all over again. (LOL)

DWM: That's just amazing. Now someone told me that when Scribner went to Chicago with Clyde Shields, at, that he showed a group of physicians in the hotel room how to bend the Teflon.

JC: When, when Quinton did that, he'd,

DWM: So he took Wayne with him as well.

JC: He took Wayne with him as well as a patient and, and Clyde Shield's wife and they had a session in a, in a hotel room and then sent, I don't remember how many quote "kits" were made up, but, but they took some Teflon and some burners and this and that to; after these Docs had been shown how to do it and, and uh, had, had been demonstrated then they went home and presumably taught somebody else or instructed somebody else to learn. And of course as, as our program evolved we had a lot of people coming into our laboratory. Physicians and technicians and had learned about the program and wanted to come in and, and learn how to do it first hand. So we, we were running a little bit of an instruction program at the same time. Sometimes several people in the lab learning first hand at, at any given day.

DWM: Um.

JC: And then the second year of the ASAIO was in Atlantic City, New Jersey and, and that time I repeated the, the demonstration in the, in the hotel. And we, we had, it must have been six or eight very interested physicians standing around asking questions and wanting to try it and it was, it was fun.

DWM: So it's sort of like the early break-out session for the,

JC: Yeah.

DWM: Conference to ah,

JC: Exactly.

DWM: Go learn how to create this shunt.

JC: Yeah. That organization was, was very different then. It, it evolved into something a lot more formal. But at the, at the time that I had a, my initial experience with ASAIO itself, people would stand up and just talk about their ideas. I remember the, the first year I was there the, the President Peter Salisbury, who was on the program to talk about a, I think it was a cardiac catheter or something like that. I expected, I expected to have a formal presentation with slides and all the rest and he stood up and waved this thing as he, as he described it and of course nobody in the audience could see it. But then he said well, if, if you're interested come on up and I'll show it to you and people got up out of the, out of their chairs and walked up and, and had a chance to see it and touch it and learn all about it. It

was just so totally different than the kind of experience that you have in, you know, at any of these medical meetings now days.

DWM: How many people would have been at the meeting in those early days?

JC: Oh a, probably a couple hundred the first, first year.

DWM: Um hm. Okay.

JC: Very, very small.

DWM: Yeah. And it sounds like it was, now it's a very focused I think on cardiac devices, but it sounds like it was pretty, had a pretty big renal, kidney representation.

JC: Yeah, it, it, renal, renal wasn't very big the first year or two, but then after that it, it got really, really big and I think there was a little bit of jealousy between the cardiac people and the, and the, mostly the cardiac people were jealous of the renal guys because they were beginning to get all the attention and uh. Jumping ahead a little bit, in 1965 the NIH, the NIDD.

DWM: Yes

JC: Developed the, what they call the renal contract program and the whole focus of that program was to, to change and improve the technique of clinical treatment of end stage renal disease. So all of a sudden there was a lot of money being, being thrown out there and a lot of, a lot of very talented people began to apply for grants and all kinds of areas that were related to, to, to dialysis. Hemo-dialysis and PD, PD. There were the guys that wanted to explore membrane technology and the guys that wanted to design Dialyzers and faster access and on and on and on. So that, that was one of the main stimuli for the in, increase in the manuscripts at the ASAIO because all this, all this work was suddenly sponsored and, and people were beginning to make the break throughs, little by little and in a way it's a shame that that program hasn't continued it. It ran from '65 through I think it was '76 or '77. But then it was terminated.

DWM: Well, I certainly know in talking to people that the demonstration projects really opened the doors of a lot of chronic dialysis facilities.

JC: Oh, yeah. And it was out of that, that, that contract program that, that the first Hollow Fiber Dialyzers were developed.

DWM: Sure. Sure.

JC: I was told later on, again, this is jumping all over the place, but I was told that the, the motivation by Dow Corning to develop the dialyzer was because the Dow Chemical Company, have you heard this?

DWM: No.

JC: The Dow Chemical Company was coming under increasing criticism because they manufactured Napalm to be used in Vietnam and they were looking for something to counter that and so they somehow learned about the, the contract program and through their resources which were heavily focused on, on chemistry, polymer chemistry and to, to the development of, of the first Hollow Fiber Dialyzers. And now of course that's, that's the technology that's used by everybody.

DWM: Absolutely. Well before we get to far away, I do want to go back to Clyde Shields.

JC: Um hm.

DWM: And what you remember about the early dialysis for Clyde Shields. How he did on dialysis, how the shunt functioned and, and did he, was he dialyzing, coming into the hospital to dialyze?

JC: He was. Yeah.

DWM: Yeah.

JC: Yeah. He dialyzed at home later, later, later on. I think he, don't quote me on this, but he, he must have dialyzed in the hospital for seven or eight years and of course at the beginning it was once a week, but then later on it was, he developed problems and as those problems were dealt with, the dialysis became shorter but more frequent. And until he was on three times a week dialysis.

DWM: Why do you think Scribner started with Clyde Shields? Was there any particular? Did he just come at the right time that they had this shunt and he, was there something about Clyde Shields that made him a good first patient for chronic dialysis?

JC: Well, I don't know precisely the, the. Scrib was, was affected deeply by losing a, a patient that had end stage kidney disease. He'd come over from Spokane ostensibly because he had acute shut down and was, was dialyzed and, and then when they discovered that he was anuric, and they he had terminal kidney failure, Scrib had to send him back to Spokane because at that time there was nothing that could be offered to him. That you know, this is a classic story that I'm sure you've heard many times. But when he, when he thought about the idea of, of, of the shunts it corresponded to the time that Clyde Shields was in the hospital with the diagnosis of end stage kidney disease. And so it was, it was Clyde's great fortune that, that he was there at the right time. And I think it was the great fortune of the program that, that Clyde had the personality to be willing to endure all the, all of the things that happened to him over a period of several years. He was kind of a complacent guy and I, I marvel thinking back on it. How often he, he had to have new cannulas he put in. Always in the, in the, in the same room where he got treatment. We didn't do these in, in the O.R. at all. It was always there. You know, the patient would put their arm out on a bedside stand and the surgeon would come in all gowned up and, and hit them with xylocaine and they'd start to work on him and here's somebody else over in the, in the corner making cannulas. Sometimes the, the T.V. would be on and people would be

watching the ballgame if it was on a weekend. And it, it all just seemed very natural. And there would be conversation going back and forth between all the people in the, in the room. But to, to have to endure that. Think about having yourself shot up with xylocaine and some. These weren't incisions like this. Some of them were long and he, Clyde had, I don't know. He must have had twenty-five or thirty procedures on his, on his blood vessels during that, that entire period. It was just, how, how you could tolerate that without displaying some, some resignation or fear or some, some emotion that. I, I don't think I could have done it like, like he did it.

DWM: So it was the, just a meeting of the right patient and the right time and everything.

JC: Yeah.

DWM: But how, that is, I can in retrospect I guess I can see how Scribner, you know, had been losing these patients. I know there's a letter on the wall there where he had the patient and they dialyzed him acutely, thinking he had acute dialysis and he, you know, comes from the brink of death with pulmonary edema and coma,

JC. Um hm.

DWM: And gets to where he's riding around in the car eating well, feeling pretty good and they realize he has chronic kidney disease and they just stopped dialysis and he dies.

JC: Yeah, yeah.

DWM: Then you, I can only imagine then to be able to take Clyde Shields, who would have been in exactly the same situation and he lived his years on dialysis. What a, an amazing change that would have been.

JC: He lived longer then that the average patient does now.

DWM: Right. Yeah. Well it just sounds like it was just the right patient at the right time. Well, that's amazing and pretty soon after Clyde Shields, Harvey Gentry came along.

JC: That's right.

DWM: And also, a very similar story did well on chronic dialysis.

JC: Well he, he did and he didn't. Uh, Harvey was a, a character in his own right. He didn't, he was not the same personality type at all that, that Clyde was. Harvey, Harvey felt the, the stricture of being a, dialysis patient. And he rebelled many times. He, he, sometimes he'd show up late. You could just tell that he was, he didn't like it. That he didn't want to do it, but he had no choice. He had a, a, a really supportive wife. And I'm sure she made a big difference in his willingness to come back and, and endure all this. But he would, he would go out and do all kinds of things. I remember one, one time he, he

spent the weekend digging clams somewhere on the coast and came back with a cannula infection that was just really bad. And no apologies at all, you know? He was living his own life the way he wanted to, or to the extent that he could. And I think his, his value to the program was pointing to everybody the fact that the program imposes strictures on people's lives that are extremely difficult and we didn't see that so much in, in Clyde because he was more complaint. But Harvey just, he rebelled and I'm not sure that his rebellion made an awful lot of difference in it, in what could be done at that time, but it certainly pointed out the limitations that, that the program had and still does for that matter.

DWM: Yeah. Yeah, that is was saving people lives but that the quality of life is definitely impacted.

JC: That's right.

DWM: By the. So you began to have these chronic patients and um, how soon did it become an issue, what were you going to do with these chronic patient? Where were you going to dialyze them? How were they going to fit into sort of an acute hospital setting? Did that become an issue very quickly?

JC: Very quickly. As, as did an equally pressing issue. Where, where was the money going to come from?

DWM: Yeah.

JC: And uh, early on we moved our, our chronic program to the 5th floor which was a, boy this is, I'm not sure I can remember the name of it. There was a, it was a, a federally funded program to do metabolic research. Kind of, kind of a blanket program and, and uh, I don't think I can remember the specific name of it. But anyway, we were assigned one room on, on this whole ward and that's where we did our, did our, our dialysis. We had at that time, I think five patients. There was Clyde, Harvey Gentry, Rolan Heming, Kathy Curtis and Jack Capalotto. I think that was, I think that was all. And so they were all scheduled in at, at various times and then in addition to those five patients, we were doing acute dialysis all, all along. And to get, to get five patients accepted required enormous persistence on Scribner's part. Because it wasn't so much the space then as it was just a, where's, where's the money going to come from? And then he was always pushing to get more patients on because he was seeing and hearing that they were not making it because there wasn't enough, enough resources to treat them. And I remember on one occasion, it wasn't just, just space for the patients either. It was space for the whole program and I, by, by that time I was running both the hemo-dialysis and the peritoneal dialysis lab that, that had been established. And also, I, I had when, when the chronic program had been funded by the NIH's contract program that, that I mentioned a minute ago, I approached Scrib and said I have some ideas about vascular access that I'd like to try. Do you think, do you think we could apply for a contract to, to do cannula research? And he said sure, if you've got some, some decent ideas. So I wrote up a proposal, I wrote up a grant proposal or a contract proposal. And it went in under his name because I'm not credentialed. So, my chances of getting it would, would have been just zero. But we got the money for the first year. And so I, I got space up in the animal experimental facility and we started out working with dogs. And I, the idea that I had that got the initial funding was to take Dacron felt and put it on the end of, of silastic, which by that time we were using for the cannulas. And then to anastomose the

Dacron directly end to end to the, to the blood vessels. And I learned about, not, how, how not to use dogs from, from that experience because they, they clotted readily and they'd tear the cannulas up and so on and so forth. So we evolved from that to other animals. But that, that was my introduction into the contract program and I, actually as it turned out, I had a contract for eleven years and several things came out of it, out of that, out of that program.

DWM: What things came out of that?

JC: Well, this is again, we're kind of just jumping all over the place, but. I started working with baboons and then later with goats and sheep. Still, still looking to, to develop techniques for improving vascular access and also to reduce infection. And I, at, at one time, I remember taking a, taking Henry Tenckhoff home one evening and mentioning that I was using the, this, this Dacron material and that it, it may work as a, as a barrier to infection for his, with, with the catheters that he was, he was working on. So he tried it and, and it did. And I think looking back on it, that was the first tangible thing that, that came out of the, the contract program that, that I had any responsibility for. And then later, many years later and, in 1968 the, the first central line that we used for, for total parenteral nutrition evolved out of some other work that I was doing. It had nothing to do with TPN at all. I was, I was looking at the effect of, of materials in the circulatory system and what I had done was to, was to put small diameter Teflon tubing in, in the, in the neck of sheep running the tubing down in the, the vena cava, superior vena cava. And on the, on the contour lateral side I had silastic that was, that was in there and I was, I was exploring the idea of, of whether, whether if these materials were in close proximity to a fistula, that the fistula flow would, would product a beneficial effect by, by blowing off the, any, any thrombotic material that, that would otherwise have developed. And at the same time Scrib had the idea of, of using the shunt for TPN. So, he, I don't know how he got the word out, but anyway a patient from California was sent up here. Jay Rieberg who's picture is out here on the wall and we tried shunting him after doing some preliminary experiments in our kidney patients. Just a shunt with a side arm to allow the introduction of the TPN solutions. And it didn't work in Jay Rieberg for very long. And so then the, the Thomas Femoral Shunt was employed with, with Rieberg and we almost lost him. In fact, I guess later on we did lose him from that. Anyway, at that same, at the same time that we had the failure with the, the shunt in, in Jay I was doing some, some autopsy work on, on one or two of the animals and I, I, I saw some improvement in the, in the Teflon and also some improvement in, in the silastic. But I, it, it looked on that, on those one or two animals like Teflon was the way to go so I suggested that we try the Teflon in, in this patient which we did and after a few weeks he developed a vena caval obstruction.

DWM: Um.

JC: The clot had formed around it, the Teflon. But also by that time the silastic was, was proven to be superior in, in additional animal studies that had been ongoing and so we tried the silastic and that's, that's where that first central line came from and then of course later on Hickman improved on it and put multiple lumens on it and used it for all kinds of different things. So those two things were outgrowth of the many years of work with it.

DWM: With access.

JC: With access, yeah. Which is still my, my main interest.

DWM: So, so this chronic program you started on the 5th floor. It sounded like the hospital was in a real quandary about it. I mean obviously you're taking care of patients, treating patients, but it's very expensive to do that.

JC: Um hm.

DWM: Is that part of what caused the program to move out of the hospital at some point? Um,

JC: Yeah but it, it, it also, it, even before, even before those pressures came up, there was a lot of criticism of the program because it was all patients being run in a hospital setting. And people were saying well if you, if you take it out of the high, high cost hospital setting where you've got all these resources, that you, that you can bring to bear; it won't be successful and that was what caused Scrib to set up the, the, the, what then was the Seattle Artificial Kidney Center was a sponsorship from the Johnny Hartford Foundation. Just as a demonstration unit that, that, it doesn't take a, a hospital with all those resources to, to do it. But it also enabled him to take on several more patients that otherwise would not have been possible.

DWM: Um hm. When did you all change from the Skeggs-Leonard Dialyzer to another Dialyzer?

JC: Scrib went to, I forget. It was either Sweden or Norway to give a presentation on the program. In, I think it was 1962 and met Frederick Kiil there. Kiil had developed a, a membrane oxygenator. And Scrib immediately saw the possibilities that existed because If you'd, if you changed from a silicon membrane to a, a cuprophane Membrane, you still have the permeability but you also have the enormous simplicity of the device itself. Whereas seventy or eighty parts for the Skeggs-Leonards, which we were at that time, we were, we had evolved from a single twelve layer stack to two Skeggs-Leonards that were four layers each. And uh, the, the number of parts came down and it became a little bit easier. But it was still an, an enormous chair, chore and it was also expensive. So this Kiil Dialyzer really was looked very promising and so he brought one back with him. A, a four layer Kiil Dialyzer made out of epoxy. Beautiful device. And you've probably heard the story about how that the customs guys got interested in this. They didn't understand what it was and they, they thought he might be smuggling diamonds or something so they made. (LOL) At the airport they made him tear this thing apart and he, he had to take his pin knife and and dig out the, the rubber gaskets that were used to form the seal around the successive layers to show these guys that, no, he wasn't smuggling anything. No, no contraband in there at all. So anyway, we started using the Kiil Dialyzer as a four layer unit and it really was great except it had a, quite a high blood volume and we quickly evolved to a two layer unit which was still a one square meter of surface area and, and that became the standard. At that same time, we were under an awful lot of pressure to, to eh, get that dialyzer available for other people in, in the U.S. especially that wanted to use it. And Wayne Quinton who had gone into business by that time tried for, for many months to build his version of the Kiil Dialyzer out of, out of epoxy and was, was not successful. Concurrently we had engaged the help of a local manufacturer of ice cream equipment, Sweden Freezer

Company and they were building the, a modern version of our old deep freeze tanks because this was part of their expertise. Building it out of stainless steel and equipping it with features that we, we just didn't have in those old, old tanks at all. And Sweden Freezer contracted with a, a manufacturer in Southern California to actually mill these Kiil boards as we called them out of, out of polypropylene and so within, within a few months why the supply of Kiil Dialyzers was no longer a problem and, and the company made a business out of both the tanks and the Kiil Dialyzers and quite a few other things for several years.

DWM: So the Kiil board made a big difference for you in, in enabling you to expand to larger numbers of people and

JC: It helped a lot.

DWM: Simplicity and set up and,

JC: And it was, it's performance was a lot more predictable than,

DWM: Yeah.

JC: Than the uh, the Skeggs-Leonard Dialyzers. We had a lot of channeling in the Skeggs. Some layers sometimes wouldn't, wouldn't open up like they were supposed to.

DWM: Sure.

JC: Dialysis wouldn't be as good as it was intended.

DWM: Sure. What, what year did Scribner actually set up his demonstration outpatient dialysis unit?

JC: That happened at about that same time. It was a, it was a busy period. (LOL)

DWM: (LOL) Every period sounds busy!

JC: Well, remember, think about this, this, the Kiil Dialyzer came into the picture it was either in '62 or '63. I think it was '62 and the, the Seattle Artificial Kidney Center came into the picture just about that same time. Nineteen, I think it was 1962 also. I mean and we were also working with Sweden Freezer to, to develop our, our system as we called it so that other people could use it as well as ourselves. And we were training people from all over the, the world actually by that time who, who had become interested in chronic dialysis. And that was a busy time.

DWM: Yeah, I mean, just looking at, you know, March, April of 1960 where you were dialyzing the first chronic patient Clyde Shields.

JC: Yeah.

DWM: To two years later you're helping with sort of the mass manufacture of Kiil Dialyzers and Sweden Freezer tanks and training people from around the world to do chronic dialysis. That must have been an amazing.

JC: And improving the cannulas. We jumped from the Teflon cannulas to the silastic cannulas.

DWM: Yeah. What an amazing time.

JC: Writing manuscripts. Writing grant applications.

DWM: Yeah. Uh, we were in talking with people it sounds like this is just a huge time of innovation where, I mean there's not a lot of going through a medical review board to make sure that this is appropriate science and, do you, what do you think allowed that time? Was that an important part of this time of innovation that it was a time of sort of trial and error?
JC: Um hm.

DWM: And that you could just move ahead if you thought,

JC: Absolutely.

DWM: Up something that was good,

JC: Absolutely.

DWM: You could move ahead with it and

JC: I, I think the program wouldn't have gotten off the ground if we had had to go through medical review boards or human, human subjects committees or animal review proposals. It, it, it would not have happened. For, for example, rather than being able to put cannulas in, in a couple of patients to try the idea, we would have had to go through animal work and my own experience doing that animal work in the dogs, which was a standard laboratory animal at that time; was so dismal, we would have said, no way. It's, it's not going to work. So instead we had the human experience which was favorable and that enabled us to, to do animal work because we knew, we knew there, there was a performance, a performance benchmark that we had not yet attained in the animal laboratory but had existed in, in patients. And so it was kind of a cross fertilization and and, but as, as you say, it, the, the whole process has changed. It's, I think it's, it's a major inhibition. Back in those days, and this is, this doesn't apply just to chronic dialysis, think of all the work that was done with open heart procedures and the heart lung machine and the, the blue baby procedures that were, that were developed. Most of them after many, many failures. We were exceptional in that we didn't have a, an initial failure. But those other, those other programs in most cases did have many, many failures. And I, I think if human subjects committees had existed then, it would have been such a, such a blanket, such a wet blanket on, on medical progress that we would not be today where, where we are. Not even close.

DWM: Well it is amazing that, I mean, these are not willie, nillie ideas, but you all were using clinical experience and basic clinical knowledge to make big changes. I mean, um, you, you, for example, the Kiil board; I mean you can look at the, the ways to apply that based on your knowledge of the membranes you had already and, but you didn't have to go through a lot of trial. Well does this work as well as the Skeggs-Leonard? I mean you brought the Kiil board back and you put it up and you used it.

JC: We just did it.

DWM: And, or, um, getting the Sweden Freezer Company to make a, a, you know, better sort of set up for you. I mean those, those, you took your experiences you had with your current tank

JC: Yeah.
DWM: And made, made obvious or calculated changes and ended up with a better system.

JC: Um, yeah.

DWM: So it's just amazing how quickly the innovation came along with just observation and trial for a new thing.

JC: But you, you see, at that time the motivation of the, of the, the clinician wasn't questioned. It was a very permissive time. Now there's all this suspicion. What, what is the motivation for, for doing this or that? And the whole, the whole process of this has changed to the point where it's, I think it's just absolutely repressive.

DWM: Yeah. Well this, it's mentioned in the memorabilia on the wall that I mean Scribner never patented any of, he didn't patent the Scribner shunt. That it, this was part of his, you know, work as a physician to find these ways to dialyze people.

JC: Yeah. We did try to patent the, the central line.

DWM: The, the, the one before the Hickman catheter?

JC: Yeah. Yeah and it and another interesting insight into then versus now, the, the University had a Patent Officer who was about 80% administrative in the President's Office and 20% the Patent Officer. That was it. And when, when we approached this guy, Wally Tribal was his name, approached, approached Wally and said we've got this new idea; it's working in patients. We think it's patentable because it's so novel. And he said, well I, I don't have the ability to judge that, but he said there is a company, a corporation called Research Corporation down in Tuscon and I'll turn this over to them and they can, they can do a, an evaluation and, and they'll let us know. Well they said, no, there's nothing, nothing patentable about it. Now, there must be at least a hundred patents on, on little derivations' and and little technological changes in that, that fundamental idea.

DWM: Yeah.

JC: And, but had we patented it, it would have I think provided funding for our program that would have carried us for years. (LOL)

DWM: Okay good. Awesome.

DWM: Well this is a good point to ah, I want to talk about peritoneal dialysis because I think you were also really involved in the Henry Tenckhoff's development of catheters for peritoneal dialysis.

JC: Well only to the extent that I mentioned already. Making the suggestion to him that he try the, the Dacron felt as an infection barrier. But before that time, and again at the, at the ASAIO I think almost every year, almost every year there was discussion about the, the problem of, of peritonitis. And all kinds of different devices were, were built and tested to, to try to alleviate it. They, I, I remember one that was made out of machine Teflon that was a, it was a, a ring with, with holes in it and then a, a tube passing through the, through the ring. The idea being that you would put the, the ring itself in the subq tissue and between dialysis the, the tube would simply be plugged. And then for, for the admission of, of PD solutions, you'd pull the plug, put a catheter into the, the cavity. Attach the catheter and go ahead and, and give the solutions to the patient. And it didn't work and there were other similar devices that didn't work. Well when, when Henry Tenckhoff became involved in peritoneal dialysis, he had several patients that he, he would actually travel to their, to their homes and make the incision in, in the interior abdominal wall and push, push these catheters in. I don't think he ever had an infection. You can ask him about that, but, you know, the, the amount of time that he was willing to devote to that was, was something else.

DWM: Because he was, I mean this would have still been the early 1960s, '63, '64 probably.

JC: Yeah. I think, I think uh, yeah it might even have been a, a little bit later than that. I think it was 1964 when Scrib asked Fred Boen to come and spend a sabbatical with us. Fred was the world's authority at that time. He had written a book on peritoneal dialysis and had described all the kinetics and so on. My memory is that Henry came shortly after that.

DWM: After that.

JC: You could, you could check with him. But, out of, out of their collaboration not only was the technique improved, but we also and I think, I think this was, I think it was Boen's idea or maybe Scribner's idea to, to go from hanging small bags of PD solutions to, to making our own solutions in 40 liter carboys. Using distilled water and then sterilizing these carboys in our, in our laboratory and I ran that laboratory for quite a few years. We had a big sterilizer installed and 40 liters of solutions we'd shove three or four of these containers in there at one time and fire that sterilizer up. Again, by today's standards it seems so crude, but it worked. And the, the evolution of the PD catheter as I remember it was that a Nephrologist in British Columbia named Palmer,

DWM: Um hm.

JC: Using the, the idea of the, of the salistic cannulas, took the same materials and had bigger diameter PD Catheters designed that would be indwelling and he had, he had some problems with, with infection for obvious reasons. And it was at that time that, that Tenckhoff started experimenting with the, the Dacron felt as a, as a, as a barrier and of course it, it worked beautifully and it's still the standard today.

DWM: Right.

JC: It's, it's interesting to me too that in this location that, that barrier works well, but when it's applied to a central line up here, the incidence of infection is so much higher. I don't, I still don't understand that.

DWM: Right.

JC: But that's the way it is and so the central line for, for dialysis especially is just frowned on. It's used widely, but people experience problems with it just over and over.

DWM: Right. And before they had this Tenckhoff catheter, I mean they were, when you say going to homes; I mean they were going in, putting in a temporary catheter, allowing somebody to do peritoneal dialysis for some period of time, pulling the catheter out and then just starting over again the next time they needed a treatment.

JC: Yeah. Yeah.

DWM: I mean, it was a temporary catheter essentially. These, these big carboys of sterile dialysate, peritoneal dialysate were being carted out to patient's homes?

JC: I think so. I don't remember that part of it, I was just so busy at that time that my main concern with peritoneal lab was making sure that the solution stayed sterile. That, I had a very competent guy that was the, the onsite manager and he, he was almost, almost pathological in, in his diligence. (LOL) The kind of guy you always want to get if you can.

DWM: Right. Well we have talked about the ASAIO, Asaio. Did you belong to any other organizations in those early, in the 1960s? Were there any other scientific groups that were working on these kinds of dialysis patients?

JC: Well there, there was an International Society of Artificial and. I think it was called ISAO, International Society of Artifical Organs it, they dropped the internal part. And that, uh, it was especially strong in Japan. The Japanese were becoming interested in, in hemo-dialysis and in, I guess in typical Japanese fashion, they just really honed in on it and not only did the treatment and the, also the research, but they, they developed this ISAO vehicle for, for publications and and uh, it, it, during the

time I was in, involved it never researched the, quite the prominence of the ASAIO but, but it was a second venue for publications that I think really served a, a useful purpose.

DWM: Did you travel around the world for some of these meetings or?

JC: I did no world travel. I, I have since, but I went to the ASAIO and the Nephrology Meetings periodically. We didn't have the money to, to have everybody in the group traveling everywhere. So, I, I just didn't.

DWM: It sounded like you might not have had the time either. (LOL)

JC: Well, no it was, it was just hit and miss as far as money was concerned. We didn't, we scraped by. I, I, again, I marvel how, how we did it because over and over Scrib would come and say, "We've got this, we've got this crisis. I'm not sure how we're going to deal with it. We've got to get some more manuscripts out." Or, "We've got to, we've got to get some more publications out and, and get those grants going." And it seemed like it always came at the last minute, especially on the, on the grant applications. It would be this mad scramble to get everything written. Of course nobody had computers in those days, it was up to the poor secretaries that would get the tablet that had been cut with, stapled inserts and I, I just, you know, they must have just pulled their hair when we weren't looking. (LOL)

DWM: Well let's talk about Belding Scribner the, what kind of man he was. What interests he had. What you remember about him, since he's not here today.

JC: Yeah.

DWM: For us to talk to and

JC: Well, he was a very hard driver, not a hard man to work with at all. Very easy to work with but he, he had, he had expectations and, and he had a, a natural ability to lead. And I can remember, especially at the beginning of our program when, when so much of it depended on the technology or the lack of technology that, that needed to be developed and as I was building the lab up, he would come down and he'd spend sometimes an hour sitting, having coffee with the group. You know? A very busy guy and he'd go back and do other things that had more, more importance, but it was partly to motivate and partly because I think he, he benefited from the exchange of ideas and, and recognized that and would do it that way. But we also had regular meetings. I, I laugh at the meetings we had from about 1960 to probably '64 or so. Once a week we would get together as a, as a, as a department. We were small enough at that time that we could do it. And there would either be a presentation of somebody's research or a discussion of perhaps a, what each of us had taken back from the ASAIO meeting that we had attended or another meeting that we had attended. And we'd eat crab. It would be, he'd have one of the, one of the people in the division go out and get, get Dungeness crab and we'd have crab and garlic bread and so as, as everybody's talking, well you'd hear the cracking of the, the crabs. (LOL) And people stopping what they're saying to swallow and it was just very different. But informal and I think

that added a lot and then later as, as the division grew we just couldn't do that anymore. We'd have more formal, formal meetings in one of the classrooms, usually in the hospital.

DWM: What size group was that early group 1960 to 1964?
JC: Oh well, let's see. There was, there were two, sometimes three laboratory people that worked in the analytical laboratory. There was Bob Hegstrom, Jim Burnell who was a Nephrologist working part time at the University, kind of the second in charge and then he also had his own practice on the outside. And uh, at the beginning there was just in the lab and then later as, as our program expanded I started hiring guys cause my feeling was that the weight of those Dialyzer and the pushing of those big tanks around required brawn more than brains really; so we had two, three, four, four guys working in my, my kidney lab and then when the Peritoneal program started we had two or three more in that, in that laboratory making the solutions. And we had fellows that, that came into the picture, but it seems like I'm missing somebody. We had a, at the very beginning we had a, a an Asian Physician, Rachit Buri from Thailand who was here for about a year and, and contributed I thought quite a, quite a bit. R a c h i t. B u r i. But heavy dependence on, on the renal fellows. A lot of the really excellent work was done by the fellows over the, over the years. And then in, it must have been about 1965, we developed a collaboration with Les Babb,

DWM: Yeah.

JC: In Nuke, Nuke Engineering.

DWM: Right.

JC: Scrib had been asked to give it, a, a talk to the, to the engineers and I think it was a day or so after that Babb having heard, heard his presentation on our, on our program; Babb called and suggested they collaborate. So we had a couple of meetings with Les in the hospital cafeteria, just trying to sort out what, you know, what areas of common interest and, and especially where, where Babb and his people could help cause it seemed a little bit strange that a Nuke Engineering Professor would have much to contribute to, to what we were doing. And they seized on the idea of something better than these big tanks that we were wheeling and, and out of that interest and focus came the idea of the proportional pumping system for making Dialysate which of course is still, is with us today. And probably will be with us forever and ever. And we used to have meetings, the building isn't there anymore, but the, on the upper campus there was a, a small teaching reactor and I remember going up there with our group the first time and as we walked in, the handed us these little uh, what do they call them?

DWM: Like a radiation button?

JC: Yeah. It's to measure radiation. There's a, there's a term for it. But anyway, they handed us these and then we went in and set in their conference room looking, looking through a glass window at this reactor down there. And, and our group is looking around like, are we, do we really want to be here? And it, it was laughable to the engineering guys because you know, they'd live there and they knew what was safe and what wasn't, but, never the less, we were, we were a little bit taken aback at the

beginning. But anyway, that's where we did most of our planning. We had a great big blackboard there. We talked through ideas just day after day after day. We'd go up there two, sometimes three times a week and hash through what was permissible and what wasn't and we were teaching those guys about,

DWM: Right.

JC: Biology and they were teaching us about engineering and it was, really a marvelous cross fertilization of ideas.

DWM: Well that's the University's setting, just did offer this fertile opportunity for you know, multi-skills set,

JC: Yeah, it did.

DWM: Approach to,

JC: Yeah. And it was so great to be able to just, either, either for them to take five or ten minutes and walk down to the hospital or we'd go up to their digs and spend the time talking to them and arguing and all, all of that. But it was, it was a, it was a great collaboration and then of course later on Babb became interested in, in the, the middle molecule idea and

DWM: Right.

JC: What, what actually happens in dialysis and kinetics of hemodialysis and many other things as well. It was a marvelous collaboration.

DWM: As I recall also, Les Babb was involved in the design of the first home hemodialysis machine.

JC: That's right. It, it came directly from the, the, that initial work that we did to develop the system that was put in the, in the, there on the 5th floor at the hospital up there. For our in, in-house patients. It was called the Monster and then the, the. Clyde Shield is the guy that named it. He, when we took that in the first time it was, it was on a, it was a big framework on wheels and we, we brought that in the room with a, the big pumps on it and there was a big tank on the top for the, the Dialysate that was made and he said something about, "What's that tricked up Monster for?" And then he, he said, "I'm not going to go on that." when we, when we described it to him and of course he did. But, he was the one that named it The Monster and then The Mini-Monster came out of that because it's just a smaller version of that, that was developed for in, in, in-home patients. And you know about the first, the first patient Carolyn Helm?

DWM: Oh, tell me about her.

JC: High school kid. She had Lupus and some other, some other medical problems. Again, what courage.

DWM: And she was young and she was somebody that Les Babb knew or?

JC: He, he, he knew her dad.

DWM: Her dad.

JC: Harry Helms, I think it, I think he was a salesman that had sold to the University or some connection like that. And he, he mentioned to Babb that his daughter had been diagnosed with kidney disease and that was after the initial collaboration between the Scribner Group and Babb's Group. So we got on the phone and talked to Scrib and again it was a, one of these situations where there's no, there's no space. You can't do it. You have no funds. You can't do it. But if we, if she could run at home, but how can she run at home? And the neurons start clicking and out of it comes this new idea. So everybody convenes in the Nuclear Reactor again and we start talking about miniaturizing it and what, what you need to monitor. How are you going to monitor it? You can't just, you can't use ah, U-Tube manometer, not in, not in a home setting cause you know, it's too complex for the, for the average patient to, to do. So step by step we, we walked through the process and then you find, well, you can't do this because of this so you've got to find a, a different, a different solution and. I think we put that, the idea together and, and had to prototype built in five or six months. It might have even been faster than that. It was very intense. Because the patient had to be run at home. No space anywhere else.

DWM: She was young. She was in her, a teenager.

JC: Yeah. She was, a think she was a Junior when we started her on it. She lived for four years. She was in college when she died.

DWM: Yeah. Then in four or five months you all put together what had been an in-patient procedure and made it an out-patient home,

JC: Yeah.

DWM: Dialysis.

JC: Yeah, right.

DWM: Yeah.

JC: And of course that machine is, is the prototype that's still is, except for minor things not, not changed at all from what it was in '65, '66.

DWM: As I recall, I had heard just generally about this young patient which, you know, brought up the issue of home hemo-dialysis. And as I recall, part of it was that she was, it was a time of the selection

committee and because of her young age and everything, she didn't really fall into the criteria where she would have been selected.
JC: Yeah, she wasn't a bread winner. She, no one else depended on her, which was one of the criteria. Yeah it was, it was a hopeless situation until things started to happen.

DWM: Yeah. You all who were working on the engineering part of this, the patient care part of this. Were you aware of the selection committee that that,

JC: Oh yeah.

DWM: Yeah.

JC: Yeah. Yeah and Scrib would talk every once in awhile about it. Yeah, it was a, it was an imperfect solution obviously and, and it bothered him. It bothered him. It, it, it, the thing about it that bothered him was having to turn people away that, in his view, well, in his view it was unnecessary and he couldn't understand and we couldn't understand why society wouldn't come to grips with the, the problem. And deal with the problem. It was just, it was pushed to the side. And uh, I'm, I'm glad I wasn't on that committee.

DWM: Yeah. What a difficult job.

JC: Oh, yeah.

DWM: Do you remember when the law passed in '72 that allowed Medicare to cover patients?

JC: Um hm.

DWM: Was, did that, did you think that would make a big change in dialysis opportunity?

JC: It did. But, I, I don't think any of us realized how big of a change it made. I, everybody had underestimated the number of patients by hordes of magnitude. The Gottschalk Report. Twenty-five thousand patients and I, I've wondered to this day whether that was purposefully under-estimated as a strategy. We have no way of knowing of course, but, but all of a sudden things just mushroomed and of course it was happening in some other parts of the world as well.

DWM: Yeah. Well I want to go out and walk along the wall here and look at some of the pictures and, and um, get you to talk about some of the pictures that are on the wall.

JC: Okay.

DWM: But before we do that I want to ask a, what you think about the future of dialysis today? I mean, what do you think will make sort of the next milestones for dialysis patients and dialysis care for us today?

JC: Well, I, I don't think I can be specific. What, what initially pops into my mind is, is this. In other parts of the world, the survival is far better than we're achieving here in the U.S. and I think we need to look at treatment practices in those places where, where it's being done the best and see how those methods can be applied here in the States. We're, we're among the worst anywhere in the, on the globe as far as the survival. Mortalities are just atrocious. I've, I've been to facilities in, well the one that sticks in my mind is, is one is Seoul, Korea. Where it's owned by private practitioners and it's their sole responsibility to be there to see that the treatment is, is being provided and the mortality is oh, it's eight percent, six percent, something on that order. Now what is, what is it about that, that is making such an enormous difference? Is it the fact that they can make a living by, by doing this and doing nothing else and being on the, on the spot? Or are there, or is it a, it, it, are there cultural issues? Or, or, or what? But I think, I think we're missing a great opportunity by not exploring the specifics of, of what's being done in these, these pace-setting facilities, that we're not able to do here in the U.S. And I don't understand why we haven't done that years ago. Do you?

DWM: No. I agree that we should look around at where there's success and figure out why we're not as successful, for sure.

JC: Yeah.

DWM: Yeah. You're retired now?

JC: Sort of.

DWM: So what do you do? What are you doing now?

JC: Well I, I retired in the mid 90s from the U and a couple of us had, had developed some, some technology in the dialysis field that, that we had patented through the University so and we, we tried to get some commercial interest in it and were unsuccessful so we formed a company around that technology and or part of the technology and we're now selling it several places in the world. We, we licensed to the University and then we in turn are sub-licensed. It's a, it's a dialysate that has acidic or assedic acid in it,

DWM: Hm.

JC: That uh, im, improves performance of, of the Dialyszer itself and can be used to offset the use of some Heparin if not all the Heparin. It's used especially for acute treatments where you can't give any Heparin. Cause, did you know that the acetic acid is a, an anti-coagulant in its own right. But it, it's administered in the Dialysate in a, in a really small amount. 2.4 milli-equivalents per liter so once it passes across the membrane into the blood, then it goes back into the patient and is quickly metabolized without affecting calcium levels and it's a, it's a beautiful simple set up that doesn't require any special techniques or learning on the part of the staff or anything. So, anyway, we're, we're selling that. We've jumped through the hoops all over the world in terms of getting regulatory approval.

DWM: So that, is that part of your traveling around the world?

JC: Yeah.

DWM: What you're doing now?

JC: Yeah.

DWM: Well, great.

JC: And then I'm active on The Board at The Kidney Center and as past, past President of The Board and I still sit on several of the standing committees, although I, I just finished my, my several years as a Trustee and now I'm Emeritus. (LOL)

DWM: (LOL) Well, and um, The Kidney Foundation here has been I guess very instrumental in providing money and worked with. I mean, look, the, the Northwest Kidney Centers is a big operation now.

JC: Oh it is.

DWM: Yeah and all the support from the,

JC: Yeah it a, we have about thirteen hundred patients. It's a 75 million dollar a year Enterprise.

DWM: Yeah. Yeah.

JC: It probably does, aside from the mortality, it, it probably it, is one of the best, if not the best facility in the world, because their, their treatment is holistic. It's not just dialysis and run. And uh, it's a, it's a good organization.

DWM: A legacy I'm sure of Dr. Scribner's approach to,

JC: Yeah.

DWM: Yeah. Would you walk out with me and look at some of these pictures?

JC: Sure.

DWM: Cause there are a lot of people in the pictures I want to ask about and,

JC: What time is,

DWM: Well, he, he was getting here maybe around eleven. So we may see him as we go out.

JC: Okay.

DWM: Hi.

UNKNOWN FEMALE: Do you want to say, "Hi" to her?

DWM: Yeah, hi.

UNKNOWN FEMALE: Here she is.

BOB DAVIDSON: Oh. Yeah, sure.

DWM: Hi.

BOB DAVIDSON: Oh hi.

DWM: Hi. Hey.

BOB DAVIDSON: Hi. I'm Bob Davidson.

DWM: I'm Dugan Maddux. Very nice to meet you.

BOB DAVIDSON: Hi. Nice to meet you.

DWM: So,

UNKNOWN FEMALE: So I see,

JC: This is Bob Hegstrom.

DWM: Hi, how are you? It's so nice to meet you. Perfect.

BOB HAGSTROM: Hi Jack.

BOB DAVIDSON: Hello Jack.

JC: How are you?

BOB DAVIDSON: Pretty good and you?

JC: Good.

DWM: Good.

UNKNOWN FEMALE: So Doctor Davidson also has been here for a long time too and I told him,

DWM: Yeah, we were just talking about that.

JC: Babb in this, in this picture Les, Les Babb. Lars Rimseret who was a, working on his PhD at, at the time this picture was taken. This is a Dialyzer that they had developed strictly as an experimental unit to help to define mass transfer characteristics. And hopefully to be applied to the other Dialyzer designs and actually that's exactly what happened. Some of the information coming out of there was used to, to the eventual development of the Hollow Fiber Dialyzers.

DWM: Hm.

BOB DAVIDSON: This is Jim Albers who was our fifth patient.

DWM: Ah, Joann's husband.

JC: Um hm.

DWM: Yeah.

BOB DAVIDSON: Are you finished with that?

DWM: I'm going to visit her in Bellingham tomorrow, yes.

JC: Oh right.

BOB DAVIDSON: Oh you are?

DWM: Yeah.

BOB DAVIDSON: Good for you and so,

BOB HAGSTROM: Oh, I thought you were going up,

DWM: I'm going up tonight and then talk to her in the morning, so.

BOB DAVIDSON: Oh. And Doctor Scribner. (LOL)

JC: Yeah.

BOB DAVIDSON: Looking like he was just fresh out of Medical School.

JC: Well so, so do you Bob. (LOL)

DWM: Oh, is that you?

BOB DAVIDSON: That's me. That's right.

DWM: Yeah and uh this, you know, we were just talking about the set up. What is, you know, what these early machines and the set up was so complicated.

BOB HAGSTROM: (UI) and it took a lot of time. But we had a master doing it.

BOB DAVIDSON: Well uh, he was a brand new faculty member and I think I was one of his first clerks.

DWM: Oh.

BOB DAVIDSON: In medicine.

BOB HAGSTROM: He came in '51 I think so.

BOB DAVIDSON: Yeah, yeah.

DWM: Wow. Well good.

BOB DAVIDSON: And then I was in practice for awhile and then I came back with them and never got away.

DWM: Yeah.

BOB DAVIDSON: But uh, he was quite a guy.

BOB HAGSTROM: Did your son become a Nephrologist?

JC: Here is a Kiil Dialysis right there.

BOB DAVIDSON: Yeah, yeah. He's in Boise.

DWM: I'm sorry.

BOB DAVIDSON: I'm sorry.

JC: They had to be placed on a tilt cart.

DWM: Yes, this is, is this a Kiil?

JC: That's a Kiil, yes.

DWM: Yeah. And they were heavy. That's what somebody was saying, yeah. Yeah. So this is a, it looks like a pretty young patient.

BOB DAVIDSON: She was.

DWM: Yeah. The, so this is The Monster?

JC: That's The Monster, that's right. That's, that's the one that when it was wheeled in the room Clyde Shields said, "What's that Monster all about?" (LOL) So that, that's where it got its name.

DWM: And who are there people in front of the Skeggs Leonard ?

JC: Well there's, that, that is Scrib. Barbara Fellows our head nurse for awhile. This is the fellow that ran my Peritoneal Dialysis Laboratory. This is the guy that ran the Kidney Hemo Dialysis Laboratory for me and you wouldn't believe it, but that's me.

DWM: Ah. (LOL).

BOB HAGSTROM: A little different hair styling there.

DWM: Yeah. (LOL)

JC: That's right.

DWM: No quite as gray, maybe too.

JC: This is a picture taken after we were moved off the University Campus. This is our coach house dialysis facility and we developed a, a, what we called a double blind ruins where the patient could be either on dialysis or a sham dialysis and we wouldn't now which because on the other side of the wall, would be either a Dialyzer or just a blood pump recirculation the blood from,

DWM: Hm.

JC: From arteries to veins so we could eliminate both the patient's perception of what was happening and also if we wanted to, we could keep that information from the physician so it was a true double, double blind set up. And then this is just a, a one way mirror right here.

BOB DAVIDSON: Yeah, yeah, I remember when you double-blinded Schizophrenia.

JC: Oh yeah. Yeah.

BOB DAVIDSON: Yeah. Negative study, but uh,

JC: Negative study, how true.

BOB DAVIDSON: But it was an important study.

FEMALE VOICE: Did you try to dialyze people that were Schizophrenic?

BOB DAVIDSON: Oh yeah.

DWM: Oh really.

BOB HAGSTROM: To get all the bad toxins out of their system, but there were,

BOB DAVIDSON: Oh yeah. It was finally the,

BOB HAGSTROM: It was a Neurological disease, it wasn't the

FEMALE VOICE: Yeah. That's interesting.

DWM: A Metabolic problem, yeah.

BOB DAVIDSON: Our two first patients. Harvey Gentry, Clyde Shield and I honestly don't know who that is.

JC: Roland Hemi.

DWM: Roland.

BOB DAVIDSON: Oh, that's Roland?

JC: Yeah. Were you, were you involved when we dialyzed him in an iron lung?

BOB DAVIDSON: That must have happened after,

JC: I think you were. I think you were because remember, we talked, we thought he had Guion Barre for awhile?

BOB DAVIDSON: Yeah. I know I, I thought for sure he had Guion Barre.

JC: Yeah.

BOB DAVIDSON: But then Uremic Polyneuropathy

JC: Yeah.

BOB DAVIDSON: Became obvious, so,

JC: But anyway, he was so bad at one point that,

BOB DAVIDSON: And he, he eventually got another one (UI).

JC: He was in an iron lung and we dialyzed him. It was probably the only time that's ever been done.

BOB DAVIDSON: Um hm. Um hm.

DWM: And did you all figure out that dialyzing him more would help? I mean,

BOB DAVIDSON: Um hm.

DWM: Did you,

BOB DAVIDSON: We were left with no other options.

DWM: And when you went this,

BOB DAVIDSON: We measure everything that we could, that could account for the neuropathy like heavy metal accumulations or thiamine deficiency or this or that. And Dirk Burchfield, your class mate,

BOB HAGSTROM: Yeah, that's right. That's right.

BOB DAVIDSON: Work on it and he said Bob, you're just going to have dialyze more, not less and we did and they got better.

DWM: And he got better, yes. Yeah.

BOB HAGSTROM: Yeah, Dick was their Neurologist.

BOB DAVIDSON: Amy got better I guess too, but he was still badly paralyzed when I left in '64.

DWM: Yeah. And here's a shunt and we were talking about the plate.

JC: That's right and that is, that was in Clyde.

DWM: Oh.

JC: It was one of the very first ones.

BOB HAGSTROM: They were the pain of our existence, these fellows until we taught nurses how to do it.

DWM: Accesses are still the pain of our existence still today.

BOB DAVIDSON: And then we taught nurses how to declot them so we didn't have to be available 24 hours a day. Talk about handing off the responsibility.

BOB HAGSTROM: (UI) Could do it better than I could.

BOB DAVIDSON: That's right. Or any of the rest of us that's for sure.

JC: That's Carolyn Hill and here's the, the original prototype mini unit right there. They built, they built this treatment room down in their, in their basement there at The Helm Household and she would, just, just as you see here in the picture, she's studied for classes while she was on dialysis.

DWM: And would her parents help put her on and, and,

JC: Her mother.

DWM: Her mother would set up and

JC: Um hm. Yeah. And here is Robin Eady,

BOB DAVIDSON: I was just going to ask if you had a picture with him.

DWM: Yeah.

JC: Robin, Robin was sent over here to be a patient and uh, was, was dialyzed briefly at the University hospital. He, he worked for me in the laboratory as a technician for awhile and then went up to Canada were he was Dialyzed and then back to Europe, back to England. Finished Med school and was a dermatologist for many years. He's retired now I understand.

DWM: I've been in communication with him and,

JC: Oh, have you?

DWM: Um, he said he would be delighted to do an interview and if I can just get over there to London,

JC: Um hm.

DWM: Sometime, so, I have been in touch with him.

BOB HAGSTROM: Well, that's another reason to go to London, huh?

DWM: Yeah.
BOB HAGSTROM: He's going to be in Seattle in March.

DWM: Oh, is he?

JC: Yeah.

DWM: For a program?

BOB HAGSTROM: It's a dialysis convention in Seattle I think in March.

DWM: Okay. Well, if I don't get to London before then, maybe I'll come to Seattle then and see him then.

JC: This is a picture of Fred Boen. This was one of our early PD systems. You, you see there the big carboy that I was telling you about in that other room.

DWM: Yeah.

JC: And this is, I think that's Clyde Shields. It is Clyde. But I don't associate him with PD at all. Was he ever on PD? It sure looks like Clyde though, doesn't it? I think it must be another patient.

BOB DAVIDSON: I'm not sure who that would be.

JC: And you've seen this picture many times, no doubt.

DWM: Yes I saw that with the article. And then you know, here's this Seattle Times where you've got pictures, I assume of patients.

JC: All patients, that's right.

DWM: And talk about the center might be closed. We were just talking about how difficult the funding was.

JC: Most of them I, I don't know by name. This is Jim Albers, the one that you saw in the other picture.

DWM: Yeah.

BOB DAVIDSON: There's a nice story about Jim and something that I'm going to give you.

DWM: Great.

BOB DAVIDSON: To take with you.

DWM: Alright. Yeah.

JC: And then this,

BOB DAVIDSON: He,

JC: This is the patient I mentioned, uh Jay Rideberg who came up from California.

DWM: Oh.

JC: This is a before and this is the after picture.

DWM: For nutrition or his peritoneal,

JC: For, for (UI) that's right. And this is just an illustration of the technique we used at that time.

DWM: Right.

JC: Yeah. There's a lot of history there.

BOB DAVIDSON: Yeah, there sure is. There's more in this,

DWM: Yeah. Well I was looking, a couple of the people I have um, talked to talk a lot about the bedside kit and I saw that, I had never seen one before.

BOB DAVIDSON: Oh my gosh.

DWM: There's the,

BOB HAGSTROM: I sure did. I worked and I had to write a, I had to write a paper to graduate with Scrib. We did a salt loading when I was in, a third year, between the third and fourth year they did salt loading on patients at the V.A. hospitals. I bet they'd never get that through a consent form again. (LOL)

BOB DAVIDSON: We used the bedside kit to see how much urine they were, or how much chloride they were putting out in their urine.

JC: These are some experimental drip chambers for the, the, those original lead tubing sets.

DWM: Yeah. I was wondering about that.

JC: I used to have to go up to the glass blowers in the physics laboratory to, to get him to make those things because, oh, they were reusable, but sooner or later they'd get broken so I'd go up there. The guy loved to talk. Jake, the glass blower, so, I'd go up there and sit there and talk to him while he, while he blew our drip chambers for us. And then bring them back down and they had to be acid cleaned, then they had to be siliconized and then put into the blood tubing sets that, that we made in the laboratory. Then after, after dialysis we'd strip everything out, acid clean the drip chambers again and re-silconized them and put them into the next blood tubing set.

DWM: Amazing. And he would literally blow them, like I've seen ornamental glass blown?

JC: Oh yeah. Oh yeah.

DWM: Yeah.

JC: He did some amazing work up there.

DWM: Yeah.

BOB DAVIDSON: This is the Dialyze that made Jack's work a little bit easier.

JC: That's right.

DWM: (LOL) Oh.

BOB DAVIDSON: It was remarkably reproducible. I mean it,

DWM: Better than,

BOB DAVIDSON: It rarely failed the test. I, it, I mean it was,

DWM: Yeah, we were,

JC: It made a big difference.

DWM: Talking about the Skeggs-Leonards and ah, just the difficulty with setting up,

JC: This is that blood pump that I told you was the, the one reliable one that we saved.

DWM: (LOL) And the canoe paddle.

JC: And the canoe paddle, oh, that's right.

BOB HAGSTROM: Uh, didn't it take awhile for the people that made the cellophane for the (UI) to know what it was being used for? They thought it was still being shipped to Seattle to meat, for, for bologna? Maybe it was, but,

JC: I, I had heard that but,

BOB DAVIDSON: Well, that kind of cellophane wouldn't work.

JC: No.

BOB DAVIDSON: It had to be (UI).

JC: No, it wouldn't work at all.

BOB HAGSTROM: Well, at least they're not paying more attention, so it wouldn't rupture so often.

BOB DAVIDSON: Keel actually came over and visited us.

JC: Um hm.

BOB HAGSTROM: Yeah.

DWM: Yeah.

BOB DAVIDSON: He was not a Nephrologist.

DWM: No it, we were,

BOB DAVIDSON: He was a bio-engineer.

DWM: Yeah.

BOB DAVIDSON: More than anything I think.

DWM: Yeah. Well good.

JC: And then that twin coil dialyzer, I've never used one. Uh, they were being phased out here in Seattle about a year or so before I had anything to do with the program. But I, we had several of those laying around and I took two of, two of them home to use to; uh I, I made, I used to make wine and I'd, I, I used that screening material to screen the grape skins from, from the, from the wine and then I finally realized what a collector's item that was so I brought it back and we've got, we've got it here.

BOB HAGSTROM: You didn't, you didn't patent it did you?

JC: (LOL) No.

DWM: Well before you go Jack, I want to take a quick picture of you, if you don't mind.

JC: Oh, okay.

DWM: And then we'll get Dr. Hegstrom going here, so I'm. I brought my little camera here. It won't take me a second,

JC: Where do you want me?

DWM: Well, do you want to sit,

JC: Over here?

DWM: Sit there? Ah, yeah, right in front of that bookshelf will be great. This is not going to be a work of art, but it will, it just give me an idea and sometimes, I put. If you see the website you'll see that I put just pictures so people can see what everybody looks like up there, so, let me just get a little closer here. Perfect. Good.

JC: Well, that's been interesting. It brought back a lot of memories.

DWM: Well, thank you so much. I just appreciate you making the big drive down here and spending the time with me.

JC: Oh, I'm glad to do it. I come down all the time. It's not that big a deal at all.

DWM: Well, very good. Thank you so much and um,

JC: Nice meeting you.

DWM: I'll communicate with you by email. It takes me a couple of, I have to send this out to transcription and get it back and edit it and then edit the audio so it's going to be a couple of months before I get things all,

JC: Oh, that's fine.

DWM: But I'll keep you in touch so when it's up, then you can look at it.

JC: Okay.

DWM: And make sure you're happy and

JC: That's great. In the mean time, I'll get on there and see what else you've got there.

DWM: Okay good. Good, good. Good.

JC: Alright, take care.